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THE ROENTGEN-RAY IN GASTRO-INTESTINAL AFFECTIONS.¹

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IN reviewing the literature on roentgenology, one recognizes that for a number of years most of the advancements in this specialty have come from the same contributors. The men who are maintaining high standards of work are few, and as a consequence the physician is often obliged to accept the interpretations of inadequately prepared roentgenologists. The apparent simplicity of this science has caused a number of men to follow it who have not the necessary preliminary training to properly qualify them for their work.

The subject is new, and its literature, particularly in English, is so scant that one who is seeking to perfect himself in this specialty is able to find but few reliable sources of information. The isolated observations and occasional monographs are not always readily accessible. The courses offered for the study of roentgenology in both graduate and undergraduate schools are limited, and the amount of time that can be devoted to the subject by the undergraduate is restricted. The average postgraduate schools do not give the thorough training which is so much to be desired, because the time allotted is too short and the number of cases completely studied far too few.

There is a lack of uniformity in the methods of roentgenological examination followed by specialists of apparently equal standing.

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To illustrate: there is no standard or test meal for roentgenographical examination of the gastro-intestinal tract. The American, German, and English test meals differ. Such a standard meal is as necessary for roentgenographical examination as the Ewald test breakfast for chemical analyses. A standard test meal would obviate the necessity of always specifying which opaque salt was used.

Physicians without sufficient experience in roentgenology often draw erroneous conclusions, and their patients are frequently subjected to improper treatment because diagnoses are made from incomplete roentgenographical findings, based on too few plates or a hasty fluoroscopic examination. Such inaccurate examinations are allowed to displace the ordinary routine diagnostic methods, and, as a frequent result, the patient is treated medically or surgically for a condition that does not exist.

An accurate knowledge of the pathology that is subject to roentgenological examination is necessary for decisive interpretations. Time and again it has been emphasized that the skilled roentgenologist must be a good clinician, one who is able to correlate the clinical history and the present physical condition of the patient with the laboratory findings. That a roentgenologist should have a thorough training in pathology has not been heretofore emphasized. If one is unable, through insufficient knowledge of pathology, to form an adequate mental picture of the physical changes resulting from disease, he cannot understand the records shown on the Roentgen plate. The Roentgen-ray may be likened to a most powerful microscope, revealing living structures in health and disease. Just as it is necessary to have an accurate knowledge of histology and pathology in order to interpret a cut section of tissue, so it is imperative that our roentgenologists should be grounded in anatomy, physiology, and pathology if they are to make their conclusions valuable and decisive to the consulting physician. Few clinicians have sufficient knowledge of Roentgen pathology to justify them in attempting the full interpretation of a series of plates.

The Roentgen-ray diagnosis of pronounced gastric pathology is comparatively easy. Definite lesions, which are conspicuous at autopsy or operation, are readily recognized. The recognition of an hour-glass stomach, a perforating ulcer of the stomach, or an obstruction of the pylorus is not very difficult. The statement has been made that fully 95 per cent. of patients with so-called stomach symptoms are not really suffering from gastric disease but from some other abdominal disease, as chronic appendicitis or cholecystitis. The roentgenologist should therefore have the special training that is necessary to enable him to discover by the Roentgen-ray the remote lesion that is the cause of the patient's symptoms. These cases of reflex irritation in which the pathological condition may be in the gall-bladder, in the appendix, or in the colon, offer the roent-

genologist his most difficult problem and an opportunity to show his experience and the refinement of his technique.

In order that the limitations and possibilities of Roentgen diagnosis may be established, it is necessary to secure a standardization of methods and technique.

Many cases have been observed which illustrate the need of a universal technique. I will quote one typical case, in which the roentgenologists concerned, leaders in this specialty in different cities, because of variation in technique, reached different conclusions. The point involved was the position of the stomach. One roentgenologist reported that with the patient in the prone position the stomach was drawn upward and to the right of the median line, indicating the so-called "gall-bladder position." The second roentgenologist independently reported as follows:

"It is to be understood that I had no knowledge of the first examinations until my conclusions were complete. If the patient is examined in the upright position, I question whether such roentgenograms as Dr. X. shows could be obtained, as in my whole series with the patient in the upright position, not only by plate but by fluoroscopy, the stomach swings well to the left of the median line and by manipulation is apparently in no way fixed. I have found by experience, whether it be true or not, that a patient studied by the fluoroscope in the prone position, such as Dr. X. refers to in his report, leads to just such conclusions as he has reached. This is due in a great measure to pressure which is to be expected in well-nourished individuals."

The question involved, a matter of position is a simple one, but because of the slight difference in technique the positive diagnosis of one examiner was discredited by the second on the basis that the observations upon which the first diagnosis was made were due to the position of the patient at the time of the examination. It is evident that a definite and uniform plan of procedure in Roentgen-ray work must be adopted if the conclusions of the roentgenologists are to be respected.

We must always remember that the stomach is a flexible, muscular organ, capable of widely different appearance when viewed with slightly varying technique under slightly differing conditions.

Roentgenologists are constantly being asked what machines to buy. A prominent roentgenologist states that he is almost daily in receipt of letters inquiring about the kind of a machine to purchase. More emphasis is often placed upon the choice of a machine than upon the acquirement of the knowledge necessary to enable one to interpret the diagnostic data produced by the machine.

As an example of incorrect diagnoses produced by embryonic roentgenologists, we would cite the following: A physician was induced by a persuasive agent to purchase a powerful Roentgen-ray machine. He took six 14 x 17 plates of six different cases, *i. e.*, one of each case, and advised surgical operation in every case.

This man, on account of his inexperience, did not know the normal roentgenographic appearance of the human gastro-intestinal tract. The six patients underwent operation, and in none of them was any pathological condition found in the abdomen. One of the cases showed a normal stomach with two peristaltic waves present. The portion of the stomach included between these waves was diagnosed as a neoplasm, and operation was advised on the strength of this diagnosis. It seems incredible that a physician without adequate training and experience in roentgenology should assume the responsibility of advising such serious surgical procedure.

A prominent surgeon in a large hospital bought a roentgenographic apparatus and undertook roentgenography. His first case was a typical hour-glass stomach, which showed very well on the single plate taken. The easy diagnosis of this comparatively simple condition greatly encouraged him to continue. Then followed a series of cases, each diagnosed from a single plate. The percentage of errors which necessarily followed was very high.

A few cases will be cited to illustrate and emphasize points previously mentioned. The first is that of a man, aged thirty-eight years, whose chief complaint was loss of weight. The roentgenologist found a slight filling defect in the transverse colon to the right of the median line. Only one examination was made. Operation for carcinoma was advised. At operation the colon was found to be normal. This roentgenologist did not make a sufficient number of plates, and did not know that the filling defect he observed is a normal finding. Since spastic manifestations may be due to various causes, we feel that no surgical intervention should be advised on a single examination.

A patient, aged thirty-five years, whose complaint was indigestion, was carefully examined by an internist, who thought he detected free fluid in the abdominal cavity. An aspiration was done and a few cubic centimeters of bloody serum secured. The patient consulted a surgeon, who, after an examination, decided that the case was one of gastric carcinoma, and desired the opinion of the roentgenologist. The surgeon had been accustomed, just before sending such cases to his roentgenologist, to invariably give them a gastric lavage. The fluoroscopic and roentgenographic examinations showed a pyloric filling defect in all the plates. A diagnosis of carcinoma was made, and agreed to by the internist and surgeon concerned. One month later the roentgenologist saw the man, who had gained in weight and was feeling very well. He realized at once that he had erred in his diagnosis and closely questioned the patient. He discovered that one-half hour previous to his roentgenographic examination the patient had eaten a hearty meal and that he had not received the usual gastric lavage. These facts easily explained the appearance of the filling defect and the consequent error in diagnosis. The man is alive and well today.

We have record of at least ten cases of deformity of the duodenal

cap in which a diagnosis of ulcer was made by roentgenography, surgery advised, and at operation a chronic appendicitis found. Such cases of apparent deformity belonging to the group of "spastic contractions" are prevalent and require diagnostic skill to distinguish them from actual lesions of the pylorus and duodenum.

A series of eight cases in which a diagnosis of gastric or duodenal ulcer was made, based upon a careful Roentgen-ray examination, is most interesting and instructive. At operation no pathology of the stomach or duodenum was found. The appendix was removed in all these cases and the gall-bladder inspected. The patients obtained no relief from their symptoms, and at subsequent operations, performed within one year, definite gastric or duodenal ulcers were found. The surgeon simply explored the peritoneal surface at the first operation and therefore failed to find the lesions demonstrated by the Roentgen-ray. These cases illustrate that the surgeon and clinician should be slow to discredit the diagnosis of the well-trained roentgenologist.

The welfare of the patient is best served by the friendly team work of the internist, surgeon, and roentgenologist. This necessitates a careful review and correlation of the findings of each of these specialties. An antagonistic and hypercritical attitude of the respective physicians concerned often retards the diagnosis.

I am of the opinion that the adoption of certain recommendations will increase the value of the Roentgen-ray as a diagnostic aid in gastroenterology. I do not offer these suggestions in a spirit of criticism, but am prompted by a desire to secure better coöperation between clinicians and roentgenologists. These recommendations are:

1. That the roentgenologist should be a trained and experienced anatomist and pathologist.
2. That there should be standardization of methods and technique.
3. That the physician acquire the ability to properly estimate the diagnostic value of a Roentgen-ray report.
4. That the patient should not be subjected to operation without a confirmation of the original findings by a second Roentgen examination made after an interval of two or three days.
5. That the clinician must not attach too much significance to the Roentgen-ray findings unless they are absolutely decisive.
6. That the lesion discovered by the Roentgen-ray must be a constant finding, regardless of position or slight variations in technique.
7. That great care must be exercised to differentiate physiological and spastic conditions from those that are essentially pathological.
8. That the Roentgen-ray report should be considered on the same basis as any laboratory report.
9. That the physician must carefully correlate the Roentgen-ray findings with the anamnesis and the clinical and laboratory findings.